PRESSURE-BASED HAPTICS

CROSS-REFERENCE

[0001] The application claims priority to provisional application 62/222,002, filed Sep. 22, 2015, and also claims priority to provisional application 62,249,685, filed Nov. 2, 2015. Both provisional applications are incorporated by reference fully herein.

FIELD OF THE INVENTION

[0002] One embodiment is directed generally to a user interface for a device, and in particular to haptics and pressure interactions.

BACKGROUND

[0003] Haptics is a tactile and force feedback technology that takes advantage of a user's sense of touch by applying haptic feedback effects (i.e., "haptic effects"), such as forces, vibrations, and motions, to the user. Devices, such as mobile devices, touchscreen devices, and personal computers, can be configured to generate haptic effects. In general, calls to embedded hardware capable of generating haptic effects (such as actuators) can be programmed within an operating system ("OS") of the device. These calls specify which haptic effect to play. For example, when a user interacts with the device using, for example, a button, touchscreen, lever, joystick, wheel, or some other control, the OS of the device can send a play command through control circuitry to the embedded hardware. The embedded hardware then produces the appropriate haptic effect.

SUMMARY

[0004] One embodiment is a system for processing a user input on a user interface. The system provides an affordance layer that is responsive when the user input includes a touch or tap. The system provides a first interaction layer that is responsive when the user input includes a first pressure of a first threshold. The system provides a second interaction layer that is responsive when the user input includes a second pressure of a second threshold.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** illustrates a block diagram of a system in accordance with an embodiment of the invention.

[0006] FIG. **2** illustrates a table of design embodiments for pressure-based haptic effects.

[0007] FIG. **3** illustrates a graphical representation of an embodiment for providing haptic effects in response to a pressure-based input.

[0008] FIG. **4** illustrates a graphical representation of an embodiment for providing haptic effects in response to a pressure-based input.

[0009] FIGS. **5**A-**5**D illustrate an embodiment which provides gesture/sensor based effect modulation.

[0010] FIG. **6** illustrates an embodiment featuring pressure-based compensation of haptics to maintain user perception consistency.

[0011] FIG. **7** illustrates an embodiment featuring a pressure-enabled user generated content.

[0012] FIG. **8** illustrates an embodiment which features effect extrapolation with pressure.

[0013] FIG. **9** illustrates a table comprising some haptic effects generated by embodiments described herein.

[0014] FIG. **10** illustrates current device functionality based on time of interaction in accordance with an embodiment.

[0015] FIG. **11** illustrates an embodiment for improving current device functionality.

[0016] FIG. **12** illustrates an embodiment which features pressure-based application functionality.

[0017] FIG. **13** illustrates an embodiment which features pressure-based rich-sticker interactions.

[0018] FIG. **14** illustrates an embodiment which features pressure-based notifications.

[0019] FIG. **15** illustrates an embodiment which features pressure-based notification visualization.

[0020] FIG. **16** illustrates an embodiment which features pressure-based notification visualization.

[0021] FIG. **17** illustrates an embodiment which features pressure-based softkey interaction.

[0022] FIG. **18** illustrates an embodiment which features pressure-based security features.

[0023] FIG. **19** illustrates an embodiment which features pressure-based notifications.

[0024] FIG. **20** illustrates an embodiment which features pressure-based direct to launch application functionality.

[0025] FIG. **21** illustrates an embodiment featuring pressure-based interactions for accessories for electronic devices.

[0026] FIG. **22** illustrates an embodiment featuring pressure-based media presentations.

[0027] FIG. **23** illustrates an embodiment featuring pressure-based device functionality.

[0028] FIG. **24** illustrates an embodiment featuring pressure-based map functionality.

[0029] FIG. **25** illustrates an embodiment featuring pressure-based peripheral device functionality.

[0030] FIG. **26** illustrates an embodiment featuring a pressure-based simulated surface.

[0031] FIG. **27** illustrates an embodiment featuring pressure-based peripheral device functionality.

[0032] FIG. **28** illustrates an embodiment featuring pressure-based peripheral device functionality.

[0033] FIG. **29** illustrates a graph representing a pressure-based simulated surface embodiment.

[0034] FIG. **30** illustrates an embodiment featuring pressure-based camera functionality.

[0035] FIG. **31** illustrates an embodiment featuring a pressure-based simulated surface.

[0036] FIG. **32** illustrates an embodiment featuring pressure-based application functionality.

[0037] FIG. **33** illustrates an embodiment of pressure-based functionality.

[0038] FIG. **34** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.

[0039] FIG. **35** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.

[0040] FIG. **36** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.

[0041] FIG. **37** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.

[0042] FIG. **38** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.

[0043] FIG. **39** illustrates a flowchart regarding an embodiment of a pressure-based application functionality.